

What is Claimed is:

1. A probe station comprising:
- 5 (a) a probe-holding assembly for holding an electrical probe;
- (b) a chuck assembly having respective upper and lower chuck assembly elements electrically insulated from each other, said upper chuck assembly element having an
- 10 upper surface for horizontally supporting a device for probing by said electrical probe, a lower surface opposite said upper surface and a peripheral surface extending between said upper and lower surfaces;
- 15 (c) an electrically conductive outer enclosure enclosing said chuck assembly for shielding against electromagnetic interference; and
- (d) said lower chuck assembly element having
- 20 respective lower and skirting components each of conductive material and each spaced from said upper chuck assembly element, said lower component including an upper surface portion extending opposite
- 25 said lower surface, said skirting component including an inner surface portion extending opposite and substantially surrounding said peripheral surface.

- 30 2. The probe station of claim 1 including a connector mechanism enabling a first nonzero potential difference to be established between said upper chuck assembly element and said outer enclosure and a second nonzero potential difference substantially equal to said
- 35 first nonzero potential difference to be established between said lower chuck assembly element and said outer enclosure.

3. The probe station of claim 1 wherein said upper chuck assembly element and said lower chuck assembly element are spaced apart free of interposition therebetween of any intermediate chuck assembly element.

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4. A probe station comprising:

- (a) a probe-holding assembly for holding an electrical probe;
- (b) a chuck assembly having respective upper and lower chuck assembly elements electrically insulated from each other, said upper chuck assembly element having an upper surface for horizontally supporting a device for probing by said electrical probe, a lower surface opposite said upper surface and a peripheral surface extending between said upper and lower surfaces;
- (c) an electrically conductive outer enclosure enclosing said chuck assembly for shielding against electromagnetic interference;
- (d) said lower chuck assembly element having respective lower and skirting components each of conductive material and each spaced from said upper chuck assembly element, said lower component including an upper surface portion extending opposite said lower surface, said skirting component including an inner surface portion extending opposite said peripheral surface; and
- (e) a connector mechanism enabling a first nonzero potential difference to be established between said upper chuck assembly element and said outer enclosure and a second nonzero potential difference substantially equal to said first nonzero

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potential difference to be established between said lower chuck assembly element and said outer enclosure.

5 5. The probe station of claim 5 wherein said peripheral surface is round and said inner surface portion is radially spaced from said peripheral surface.

10 6. The probe station of claim 5 wherein said inner surface portion and said peripheral surface are separated from each other by an open gap.

15 7. The probe station of claim 5 including a positioning mechanism for moving said upper chuck assembly element and said skirting component in unison with each other in mutually perpendicular directions.

20 8. The probe station of claim 5 wherein said connector mechanism includes respective first, second and third conductors electrically connected to said upper chuck assembly element, said lower chuck assembly element and said outer enclosure, respectively.

25 9. The probe station of claim 8 wherein said connector mechanism includes respective fourth, fifth and sixth conductors electrically connected to said upper chuck assembly element, said lower chuck assembly element and said conductive outer enclosure, respectively.

30 10. The probe station of claim 5 wherein said connector mechanism is accessible for connection to an external test instrument from a location exterior of said outer enclosure.

11. A method for guarding a probe station comprising:

- (a) providing a probe-holding assembly for holding an electrical probe;
- 5 (b) providing a chuck assembly having respective upper and lower chuck assembly elements electrically insulated from each other, said upper chuck assembly element having an upper surface for horizontally supporting a device for probing by said electrical probe, a lower surface opposite 10 said upper surface and a peripheral surface extending between said upper and lower surfaces;
- 15 (c) shielding said chuck assembly against electromagnetic radiation via an electrically conductive outer enclosure enclosing said chuck assembly;
- 20 (d) providing on said lower chuck assembly element respective lower and skirting components each of conductive material and each spaced from said upper chuck assembly element, said lower component including an upper surface portion extending opposite 25 said lower surface, said skirting component including an inner surface portion extending opposite said peripheral surface;
- (e) providing a connector mechanism; and
- 30. (f) electrically guarding said upper chuck assembly element by means of said lower chuck assembly element including the steps of establishing, via said connector mechanism, a first potential difference 35 between said upper chuck assembly element and said outer enclosure and a second potential difference substantially equal

to said first potential difference between said lower chuck assembly element and said outer enclosure.

5 12. The method of claim 11 including simultaneously moving said upper chuck element and said skirting component so as to keep the spacing therebetween substantially constant.

10 13. The method of claim 11 including measuring a low-level current through said connector mechanism, said low-level current being within a single-digit femptoamp range.

15 14. The method of claim 11 including developing a voltage potential on said upper chuck assembly element through a first pair of conductive elements while guarding and shielding said first pair and, simultaneously, measuring said voltage potential
20 through a second pair of conductive elements while guarding and shielding said second pair.

 15. The method of claim 11 including detachably interconnecting physically said chuck assembly
25 and said outer enclosure by means of at least one flexible electrical line.